2019 NEWS

NAVAL MEDICAL RESEARCH UNIT DAYTON

YEAR IN REVIEW

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Approved for public release

Who are Dayton's Navy Scientists?

Dr. Karen Mumy

#NAMRUDayton

DAYTON, Ohio -- Dr. Karen Mumy, Naval Medical Research Unit Dayton's (NAMRU-Dayton) Director of the Environmental Health Effects Laboratory (EHEL), is a board-certified toxicologist with the American Board of Toxicology and a member of many scientific societies, including the Society of Toxicology and the American Society for Microbiology. Her areas of expertise include toxicology, chemical exposure, health effects of exposure, environmental exposures, microbiology, cellular biology, inflammation, and the microbiome. A member of the research team since 2009, she uses her multifaceted background to think outside the box and creatively tackle military research needs.

"Every day on the job is different and all of my professional efforts are ultimately channeled into ensuring that EHEL succeeds in its mission," said Mumy.

As EHEL director, Mumy leads the Navy's largest basic science research lab that focuses on exposure effects and toxicology. The lab is made up of over 40 active duty, civilian and contractor personnel who focus on deciphering and addressing the health effects of service members exposed to environmental stressors and hazards. While the lab's mission hasn't changed drastically since its inception in 1959, Mumy has seen it broaden due to the scientific advancements and methodologies allowing researchers to look at things now that were not possible even just ten years ago.

Despite the demands of high-level duties, she makes sure to commit time to advise her team.

"One of the parts of my job that I love [is that] I get to spend a lot of time with the scientists," said Mumy.

Interacting with her team strengthens Mumy's already strong appreciation of collaboration and the value of different perspectives and research backgrounds.

"Being a leader through this experience, one thing that I have always appreciated…is the diversity of the research team," said Mumy, "We've brought on so many people in the last year, and they all come from their own little niche areas. But, when you put them together with somebody else's niche, they can do things that you just would never see coming."

Further emphasizing, Mumy remarks, "You put brilliant minds with other brilliant minds, and the ideas that they come up with and the ways to answer a question…it's fascinating to watch". She adds, "As individuals-they're fantastic on their own-but you put them together and it's mind-blowing."

As a leader, Mumy spends a lot of time thinking not only about the present state of her laboratory, but also its future.

"EHEL is in a wonderful position right now because we have brought on so much talent and just flat-out genius. We have very, very talented researchers that are up-to-date on recent methodology and state-of-the art techniques, and we've worked hard to acquire the newest instrumentation to be able to answer questions," said Mumy.

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03.08.2019 published, DVIDS

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She sees the lab's ability to protect the warfighter not only from long-term or long-lasting effects, but also…

from short-term issues that could affect warfighter's quality of life or operational performance. This is key in a field that historically has focused more on long-term illnesses, such as cancer.

"Certainly we are aiming to protect against cancers, but we are also heavily focused on recognizing other risks associated with exposures, such as those that may lead to things like memory impairments, hearing loss, depression or anxiety," said Mumy, "These are such a big part of a service member's wellbeing when they come home, and these are just a few of the many areas that I'm very proud of."

In an effort to "maintain a pulse regarding what the up and coming issues are" Mumy and eleven scientists from the Environmental Health Effects Laboratory are attending the 58th Annual Society of Toxicology (SOT) meeting in Baltimore, March 10-14. SOT brings national and global scientists together to share influential research in the field of toxicology.

Link to original story: https://dvidshub.net/r/gdiyjs

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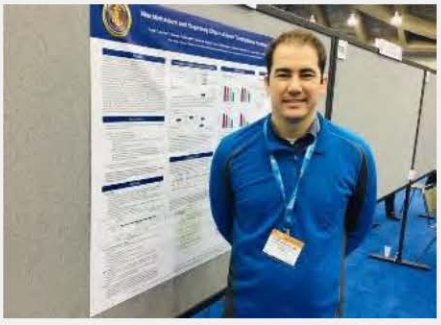
NAMRU-Dayton Researchers Attend 2019 Society for Toxicology

March 10-14, 2019. Our researchers attended the 2019 Society of Toxicology meeting in Baltimore, Maryland to connect with national and global innovative scientists. Our Environmental Health Effects Laboratory showcased their research efforts to keep military service members safe.

"Attending the annual Society of Toxicology meeting allows us to maintain a pulse regarding what the up and coming issues are, as well as the re-emerging issues and the legacy issues," said Dr. Karen Mumy, Director of the Environmental Health Effects Laboratory.



Co-Investigator, Dr. Andrew Keebaugh, presented a poster on behalf of Dr. Frank Golich, chemist and principal investigator on a NAMRU-Dayton research effort investigating the health effects of the operational environment, contributing to the safety of our warfighters.

Military service members are often required to perform complex tasks as part of their duties and may experience chemical exposures that are capable of producing depressant effects, imparting them to perform these tasks. A team from our Environmental Health Effects Lab is studying the health effects of such exposures to refine safe limits.

Who are Dayton's Navy Scientists?

Dr. Richard Arnold

#NAMRUDayton

DAYTON, Ohio -- Over the past several decades, aerospace medical research has evolved in a number of ways, and the Naval Medical Research Unit Dayton (NAMRU-Dayton) continues adapting to meet the growing needs of the fleet. Dr. Richard Arnold, Director of the Naval Aerospace Medical Research Laboratory, has helped navigate the changes during NAMRL's time as a standalone laboratory in Pensacola, Florida and after the 2010 formation of NAMRU-Dayton command at Wright-Patterson Air Force Base (WPAFB), Ohio.

As director, Arnold is responsible for executing NAMRL's research mission, which is to mitigate and prevent leading factors associate with aviation mishaps as well as to protect and enhance the health, readiness, and performance of aircrew. The lab's core research capabilities include altitude effects, fatigue assessment and mitigation, acceleration and motion effects, motion sickness countermeasures, spatial disorientation mitigation, aircrew neck/back pain and injury, vision standards and performance, and aviation personnel selection testing. His leadership plays an integral part of NAMRU-Dayton's emergence at the forefront of military aerospace medical research.

Initially attracted to a career in academia, Dr. Arnold's interest in history, particularly the historiography of psychology, led him to military research.

"I was getting my PhD in differential psychology, and psychological testing is a big part of that," explained Arnold. "I knew that the military, during WWI and WWII, had enlisted or conscripted psychologists to help with screening and selection testing for soldiers and sailors, generally, but in aviation specifically. One day I thought to myself, 'Maybe I'll see what the military is doing these days'."

His interest led him to a program with a six-month flight school component, and he commissioned in 1999 as a Naval Aerospace Experimental Psychologist.

"I was lucky enough that my first assignment at the Naval Aerospace Medicine Institute (NAMI) was in selection testing in which I had a good background," said Arnold, "but then I went to my second tour [which] was completely out of my field—it was simulators, simulation-based training research, it was very technical. I did not have much of a technical background at all, but you kind of adapt."

After leaving the military he ran a small consulting business specializing in aeromedical and human factors research. Arnold returned to the Navy as a civilian staff scientist at NAMRL, Pensacola and became the scientific director in 2010.

Under his leadership, NAMRL's research remained active up to and through the move despite the fact that some labs directed to move by the BRAC were closing down.

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04.29.2019 published, DVIDS

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"So much of our success is dependent on personalities, reputation, and output," said Arnold. "If we had just closed down and then re-opened and started from scratch, no one would have known who we were. So we kept research programs and projects active. We identified spaces in Dayton, we identified collaborators….Everything remained in motion throughout the move so we stayed engaged with the sponsors."

For Arnold, moving to WPAFB was a great opportunity for NAMRL. "We got moved to be co-located with USAFSAM [U.S. Air Force School of Aerospace Medicine], and we worked very closely with the Air Force aeromedical community."

Attracting and retaining scientific talent is also important to a director and another advantage of moving the lab to WPAFB.

"We have the capability of recruiting scientists here. It's night and day. It was very difficult to recruit [in Pensacola]," remarks Arnold. "The facilities here are fantastic. Not only our own facilities, but the facilities we have access to on base. It's wonderful."

Today, NAMRL houses an acceleration research facility that includes the world's only Disorientation Research Device: the Kraken as well as various vestibular oriented research simulators. Additionally, NAMRL has an on-site fabrication shop.

As the lab continues to grow and become more established, Arnold is looking ahead at not only NAMRL's scientific mission and strategic plan, but the scientific expertise of his staff and his supervisory responsibilities.

According to Arnold, the researchers are "the pointy end of the spear, and my job is just to help them get their jobs done."

He is proud to have a hand in bringing together the group of NAMRL scientists who represent NAMRU-Dayton through their participation in annual scientific conferences such as the upcoming 90th Aerospace Medical Association Meeting (AsMA), May 5-9, and other activities that bring to light the command's collective achievements.

"They're a great group doing amazing research, and they've got a great reputation across the Department of Defense. I'm proud of the hand I had in bringing them here, helping them, match-making with sponsors and collaborators. But they make it all happen, I don't," said Arnold.

Arnold is an active member of AsMA and served as the 2017-2018 Chair of the DoD Human Factors Engineering Technical Advisory Group (DoD HFE TAG).

Link to original story: https://dvidshub.net/r/kxftnp

04.29.2019 published, DVIDS

NAMRU-Dayton scientists participate in Shoresh Conference

04.18.9 published, DVIDS

TEL AVIV, Israel -- Six scientists from the Naval Medical Research Unit Dayton (NAMRU-Dayton) attended and presented at the Shoresh Conference April 7-12 in Tel Aviv, Israel as invited members of the U.S. Department of Defense (DoD) and Israel Defense Forces (IDF) Aerospace Medicine and Naval and Undersea Medicine Working Groups. Attendees included the Surgeons General of the Navy, Air Force, and National Guard Bureau, senior leaders from the Defense Health Agency and U.S. Army Medical Research & Material Command, scientists from NAMRU-Dayton and the 711th Human Performance Wing, as well as other Service organizations.

The NAMRU-Dayton contingent included Dr. Richard Arnold, Director of the Naval Aerospace Medical Research Laboratory (NAMRL); Dr. Karen Mumy, Director of the Environmental Health Effects Laboratory (EHEL); Commander Tatana Olson, Deputy Director of NAMRL and aerospace experimental psychologist; Lieutenant Commander Matthew Doubrava, Department Head of NAMRL's Biomedical Sciences Department and senior flight surgeon; Lieutenant Commander Matthew Shipman, Department Head of EHEL's Technical Research Support Department and aerospace physiologist; and Dr. Eric Robinson, research psychologist for NAMRL.

The Aerospace Medicine Working Group discussed aeromedical research priorities that specifically address the challenges of operating in extreme aerospace environments. This year, NAMRU-D and IDF scientists shared research addressing aircrew back and neck pain, spatial disorientation, the use of EEG in the early detection of hypoxia and fatigue, and personnel selection for Unmanned Aerial Systems (UAS).

The Naval and Undersea Medicine Working Group discussed extreme environment challenges, including those of confined spaces such as the submarine environment, as well as ways to improve the safety, comfort and survivability of the warfighter. NAMRU-Dayton briefings focused on prolonging survival in closed atmospheres, particularly with regard to continuous and emergency exposure guideline limits for operational and disabled submarines, countermeasures for motion sickness, and an overview of EHEL's unique capabilities and scientific expertise for studying the health effects of environmental hazards and stressors in support of the Submarine Atmosphere Health Assessment Program

NAMRU-Dayton's attendance symbolizes an ongoing collaborative relationship with the Aerospace Medicine and Naval and Undersea Medicine research entities in Israel and significantly builds upon the foundations of prior joint work.

Link to original story: https://dvidshub.net/r/2jzmjm

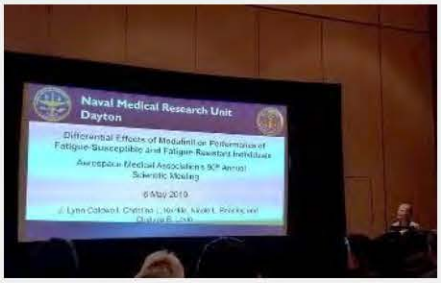
April 7-12, 2019. Six scientists from the Naval Medical Research Unit Dayton attended and presented at the Shoresh Conference April 7-12 in Tel Aviv, Israel as invited members of the U.S. Department of Defense (DoD) and Israel Defense Forces (IDF) Aerospace Medicine and Naval and Undersea Medicine Working Groups.
Left photo. NAMRU-Dayton scientists at the Shoresh Conference Gala. From left to right - Dr. Eric Robinson, research psychologist for Naval Aerospace Medical Research Laboratory (NAMRL); Dr. Richard Arnold, Director of NAMRL; Commander Tatana Olson, Deputy Director of NAMRL and aerospace experimental psychologist; Lieutenant Commander Matthew Doubrava, Department Head of NAMRL's Biomedical Sciences Department and senior flight surgeon; Dr. Karen Mumy, Director of the Environmental Health Effects Laboratory (EHEL); and Lieutenant Commander Matthew Shipman, Department Head of EHEL's Technical Research Support Department and aerospace physiologist.
Right photo. NAMRU-Dayton scientists stand in a national park in the Negev Desert during a cultural site visit. From left to right - Dr. Arnold, Lt. Cmdr. Doubrava, Dr. Robinson, Cmdr. Olson, and Dr. Mumy.

NAMRU-Dayton Researchers Attend 2019 Aerospace Medical Association Meeting

May 5-9, 2019. During the 2019 Aerospace Medical Association (AsMA) meeting, NAMRU-Dayton research staff from the Naval Aerospace Medical Research Laboratory (NAMRL) and the Environmental Health Effects Laboratory (EHEL) attended several presentations to hear how other professionals are contributing to aerospace medicine and human performance research. AsMA is the international leader in aerospace medicine and human performance whose mission it is to apply and advance scientific knowledge to promote and enhance health, safety, and performance.

NAMRU-Dayton researchers participated in a panel presentation on several studies investigating the impact of either high or low oxygen on neurophysiology. Such studies are part of a broader effort to better characterize the environment for military high-performance aircraft as high oxygen levels are a constant exposure in tactical aviation, and low oxygen levels are a constant threat.

Three of our fatigue research assistants from NAMRU-Dayton's NAMRL presented high-impact research at the poster session. Ms. Kayelin Tiggs (left) discussed the differential effects of modafinil on mood state in fatigue-vulnerable versus fatigue-resistant individuals. Mr. Henry Stephenson's (middle) poster focused on the response speed on the Psychomotor Vigilance Task predicts performance on a variety of cognitive tasks during extended wakefulness. Ms. Christina Kunkle (right) presented findings on the differential effects of modafinil on the speed accuracy trade-off volatility of fatigue-vulnerable and fatigue-resilient individuals.



Dr. Lynn Caldwell, senior research psychologist at NAMRU-Dayton, discussed her team's research findings on the differential effects of modafinil on performance of fatigue-susceptible and fatigue-resistant individuals.

"By tailoring pharmaceutical countermeasures to specific individuals, overall mission effectiveness and safety will increase potentially without over-reliance on medication," said Dr. Caldwell.

Ultimately, the identification of fatigue vulnerable individuals will support tailored implementation of fatigue countermeasures.

Who are Dayton's Navy Scientists?

Lt. Cmdr. Matt Shipman

#NAMRUDayton

DAYTON, Ohio -- A product of a military family himself, Lieutenant Commander Matt Shipman's Navy journey began when he made a change from academic research and identified a desire to fly - the U.S. Navy offered an opportunity for wings and research.

With an undergraduate degree in biology and a doctorate in biochemistry, Shipman was commissioned in the Navy and earned his wings as a Naval Aerospace and Operational Physiologist (AOP), joining a small group of aviation physiologists supporting the operational readiness of the Navy and Marine Corps warfighters.

During his first assignment Shipman operated with an attitude of "mission first" and that continues in his current role in support of the Naval Medical Research Unit Dayton (NAMRU-Dayton) today. As an AOP, Shipman works to bridge knowledge gaps between the aeromedical researchers and the line by participating in working groups focused on the research and development of techniques and tools for mitigating risk in the tactical aviation environment.

"I'm a flight physiologist by trade. I'm actually a biochemist by training; it's the reason I'm here," said Shipman.

As NAMRU-Dayton's Technical Research Support Department Head in the Environmental Health Effects Laboratory (EHEL) Shipman oversees aspects of research support for over 25 research studies that investigate health, performance and safety. For Shipman, his own research focus is primarily on investigations of microbiomics, small molecule physiology and systems biology related to questions of environmental toxicology and stressors.

"When it comes to environmental exposures and how the environment impacts our joint warfighters, I see NAMRU-Dayton as having a very big role in pushing the Navy's efforts forward," remarked Shipman.

Building and expanding these capabilities and capacities in his role as department head is a source of great pride for Shipman.

"We recently have taken delivery of several major pieces of capital equipment, including a quadrupole time-of-flight (Q-TOF) mass spectrometer," said Shipman, "which is pretty much the state-of-the-field to analyze small molecules these days. It is going to be a major benefit to us as we move forward. We've currently completed installation of the Q-TOF and are finishing initial method development."

Environmental Health Effects Lab is charged with assessing potential health effects associated with unique operational environments such as nuclear submarines and shipboard environments, and Shipman's department will be shaped by the emergence of new scientific approaches, instrumentation and warfighter environments.

"Our demand signal comes from what's happening on the fleet. Our umbrella covers anything that relates to environmental health effects" explained Shipman.

In midst of all his work with the technical research support department, Shipman remains focused on the unique contributions made by EHEL as a whole and the legacy he's been helping to expand and uphold.

08.05.2019 published, DVIDS

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Naval Medical Research and Development's 2018 Junior Officer of the Year

06.07.2019 published, DVIDS

DAYTON, Ohio -- Lieutenant Commander Micah Kinney, Naval Aerospace Optometrist, was selected as the Naval Medical Research and Development Enterprise 2018 Junior Officer of the Year (JOOY). The Navy Surgeon General, Vice Admiral Forrest Faison presented the award to Lt. Cmdr. Kinney during a site visit to Naval Medical Research Unit Dayton.

The JOOY award recognizes junior officers who exhibit the highest of standards of professionalism, initiative, and dedication to performance of duty as a Naval Officer.

"Lt. Cmdr. Kinney has established himself as a Department of the Navy and Department of Defense leader in vision research," said Captain Matthew Hebert, Commanding Officer, Naval Medical Research Unit Dayton.

Lt. Cmdr. Kinney serves as the Department Head of the Naval Aerospace Medical Research Laboratory's Acceleration and Sensory Sciences Department at NAMRU-Dayton. He is responsible for directing the activities of 17 military researchers, civilian scientists, and contract personnel.

This past year he was competitively awarded $1M in research funding to significantly advance DoD and NASA understanding of critical human performance challenges associated with mild vision loss, Spaceflight Associated Neuro-Optic Syndrome, and spatial disorientation.

"I feel like I have the best job in the U.S. Navy. My time at NAMRU-Dayton has been filled with incredible opportunities. I am planning on making a career out of the Navy and continuing to serve the warfighter," said Lt. Cmdr. Kinney.

Lt. Cmdr. Kinney has strong military roots - members of his family have served since World War II. In addition to his work at NAMRU-Dayton, he has trained more than 50 U.S. Air Force Optometrists and supported Naval Health Clinic (NHC) New England by providing over 100 clinical vision exams during a recent personnel shortage. As a volunteer reviewer for the Council on Optometric Practitioner Education, a National Board that certifies optometry continuing education (CE), he reviewed over 20 hours of CE courses during 2018.

"I am humbled to meet and work with our service members," said Lt. Cmdr. Kinney. "They keep me motivated. Listening to their needs and working on solutions helps me feel like I am doing my part to enhance their ability to do theirs."

Lt. Cmdr. Kinney is active in the community too. He volunteers as a Committee Member for Boy Scouts of America, supports youth groups, and volunteers at a local sports complex for 4th and 5th grade soccer teams.

Within the past year he was recognized as the 2018 Armed Forced Optometric Society (AFOS) Navy Junior Optometrist of the Year and received a Certificate of Appreciation from AFOS, "For significantly contributing to the advancement of our profession by participating in the Fall 2018 optometric continuing education program."

His extensive research portfolio includes vision science, aviation human factors, aviation vision standards and laser eye protection. His current research interests include color vision assessment for special-duty occupations, the impact of laser veiling glare on aviator human performance, return to duty guidance following reduced visual acuity, and human visual performance in chem-bio operating environments.

Link to original story: https://dvidshub.net/r/7rprha

Navy Surgeon General Visits Naval Medical Research Unit – Dayton

By: Angela Ciancio, U.S. Navy Bureau of Medicine and Surgery

06.10.2019 published, DVIDS

FALLS CHURCH, Va. (NNS) -- Vice Adm. Forrest Faison, Navy surgeon general and chief, U.S. Navy Bureau of Medicine and Surgery, visited the Naval Medical Research Unit Dayton (NAMRU-D) to tour the Naval Aerospace Medical Research laboratory (NAMRL) and the Environmental Health Effects Laboratory (EHEL) June 6.

This was the first time a Navy surgeon general visited NAMRU-D, which stood up at Wright-Patterson Air Force Base in 2010.

“It is wonderful to see the labs I have heard so much about,” said Faison. “The confidence of our aircrews is due largely in part to the incredible research being done here to keep them safe.”

While physiological episodes (PEs) are not a new phenomenon in the aviation community, the increase in occurrence made the issue a top priority not only for Navy Medicine, but the Department of Defense as well. Much remains unknown about the causes behind PEs but, NAMRU-D continues to conduct a wide range of innovative research to combat the issue.

Faison began his tour of NAMRU-D with the Reduced Oxygen Breathing Environment (ROBE) within the NAMRL. The ROBE is a 12 by 21 foot enclosed room capable of simulating altitudes ranging from sea level up to 34,000 feet and capable of going down to four percent oxygen. This in essence, serves as a more realistic normobaric, or non-pressurized, training environment for multiple subject exposure.

In addition, Faison spoke with principle investigators and saw firsthand the unique devices used to study various potential factors of PEs to include assessing sensors, pressure issues, contaminants and toxins, and respiratory physiology.

“The research here is incredibly advanced,” said Faison.

He continued his tour to the Environmental Health Effects Laboratory (EHEL) where studies on the potential health effects associated with exposure to the various environmental stressors military men and women face are conducted. The EHEL has the capability to replicate and assess health impacts of a number of environments Service men and women operate in, including hypobaria (the result of exposure to atmospheric pressures) in diving and in flight. By assessing chemical and physical stressors, and the combinations of the co-stressors the EHEL can develop health protective exposure standards for our military and civilian populations.

During his visit, Faison was introduced to NAMRU-D’s $19 million disorientation research device known as the Kraken™. The device was designed and built to allow researchers the most realistic motion simulations aircrew may experience in flight.

The 245,000 pound device is equipped with 4,500 horsepower, simultaneous motion on six axis, sustained planetary motion of 3G and horizontal travel up to 16 ½ feet. Its data acquisition system also allows analysts to access physiological effects in real time.

Faison credited the Kraken™ as a “life-saving device”.

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After Faison's tour through the laboratories, he addressed the staff during an admiral's call where he presented Lt. Cmdr. Micah Kinney, Naval Aerospace optometrist, with the Research and Development Enterprise 2018 Junior Officer of the Year (JOOY) award. Kinney serves as the Department Head of the Naval Aerospace Medical Research Laboratory's Acceleration and Sensory Sciences Department at NAMRU-D.

Faison met Kinney earlier in the day while touring the vision science laboratory which evaluates and seeks to improve human system interactions with increasingly complex display technology used in aviation, shore, surface, and subsurface special-duty occupations.

Before leaving, Faison thanked Capt. Matthew Hebert, commanding officer, NAMRU-D, and the rest of the NAMRU-D team for their hospitality and reiterated the significance of the work being done.

"The privilege and honor has been all mine to meet the team here. The amazing work you are doing every single day benefits countless lives across the fleet and around the world. Their families sleep well at night knowing that you are here taking care of them. So, thank you," said Faison.

Navy Medicine is a global health care network of 63,000 personnel that provides health care support to the U.S. Navy, Marine Corps, their families and veterans in high operational tempo environments at expeditionary medical facilities, medical treatment facilities, hospitals, clinics, hospital ships and research units around the world.

Link to original story: https://dvidshub.net/r/8f2oky

Controlling the Kraken, First Research Study

07.03.2019 published, DVIDS

DAYTON, Ohio -- Researchers from the Naval Medical Research Unit Dayton (NAMRU-Dayton) presented on the first research study conducted in the Disorientation Research Device (DRD) capsule during the Spatial Disorientation and Performance panel at the 2019 Aerospace Medical Association (AsMA) annual meeting in Las Vegas, May 6.

The DRD, also known as the Kraken, is the Navy's newest one-of-a kind aerospace medicine research device that is housed and operated at NAMRU-Dayton at Wright-Patterson Air Force Base, Ohio.

"The DRD was designed as a basic research device. Our long term vision, and the first challenge presented to us, was the immediate development of the DRD for an applied research study looking at pilot spatial awareness and commercial aviation mishap prevention," said Captain Richard Folga, Naval Aerospace and Operational Physiologist, Kraken Program Manager and Engineering and Technical Support Services Department Head at NAMRU-Dayton.

In support of NASA's Advanced Flight Deck Countermeasures – 4 (AFCD-4) project testing safety enhancements to prevent loss of energy state awareness in commercial aviation, the Kraken team overcame several significant challenges.

"We had to prove we could fly this device like an airplane while driving the visual displays like a high fidelity flight simulator" said Folga. "This was a huge challenge for the first project and will continue to be a challenge for years to come. There was enormous effort put into mastering motion control by interpretation of offline flight simulation generated flight physics data and creating the technical approach to smooth the transfer of commands to the DRD."

The team developed six custom software applications that included resolving network architecture congestion, code development for the flight controls and high speed synchronous remote communication for in-capsule and in-control room processers.

"To have all components work cooperatively on one network we had to create unique software applications and interfaces as well as custom build and integrate NASA-provided hardware and software," said Folga.

During the panel, Mr. Cortland Etgen, applied mathematician and DRD Motion Control lead explained, "We explored models and conventions applied to similar flying devices throughout history."

Jointly with NASA, the Kraken's first human subjects experienced a portion of the research device's capabilities. Commercial airline pilots were exposed to two motion conventions, the 'Big Stewart' (6 degrees of freedom limited motion cueing) and the 'Gx Centrifuge' (1 degree of freedom using the planetary axis) that demonstrated the Kraken was ready to study human perception on complex motions. This includes the applied work of man in the loop pilot spatial disorientation. Check out NASA Langley Research Center's "Life in the Lab" Production here: https://youtu.be/soGTmFuNgH0

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According to Etgen, the 'Big Stewart' generated flight cues as accurately as possible and the 'Gx Centrifuge' replicated flight take off and sustained acceleration sensations.

As a result, all of the commercial pilots' self-reported motion sickness scores were below 1 on a 10-point scale for all scenarios.

"The Disorientation Research Device is a very important tool in future spatial disorientation work," said Dr. Henry Williams, Senior Research Psychologist at NAMRU-Dayton.

Further applications of the newly developed flight motion washout solutions are being applied to Dr. Williams' work looking at control reversal errors in experienced pilots. A control reversal error occurs when a pilot moves the stick in the direction opposite to that required for a wings-level recovery, as may happen during transition from visual flying conditions to instrument flying.

The establishment of an applied research program centered on the Kraken addressing pilot spatial disorientation aids researchers working towards solutions to protect and enhance the health, readiness and performance of aircrew.

Link to original story: https://go.usa.gov/xptCq

Naval research unit members participate in local science fairs

06.07.2019 published

WRIGHT-PATTERSON AIR FORCE BASE, Ohio -- Over the past school year, Naval Medical Research Unit-Dayton's (NAMRU-Dayton) military and civilian command members alike visited local science fairs in an effort to meet with talented students hoping to pursue careers in science, technology, engineering, and mathematics (STEM), and bring awareness to career opportunities in naval research.

"The students had the opportunity to not only demonstrate their basic scientific knowledge, but to practice presenting their work, responding to questions, and discussing real-world applications of their results," said Commander Tatana Olson, Naval Aerospace Experimental Psychologist and deputy director of NAMRU-Dayton's Naval Aerospace Medical Research Laboratory. "We also had the opportunity to discuss how they might improve their projects if they did them again," she remarked, speaking further about her experience as a judge with the Stivers School for the Arts in Dayton.

Senior research engineer, Dr. Barbara Shykoff was also involved, visiting Thurgood Marshall High and Trotwood Madison Middle school in addition to volunteering on Montgomery County Science Day.

"It was a delight to see that the science fairs were a stimulus for thought and an outlet for success for both academically-inclined students and for some who struggle with aspects of school," said Dr. Shykoff. "I enjoyed meeting the students, some of whom were excited to meet 'real scientists', and all of whom made a real effort to converse meaningfully with unknown adults."

The science fairs also offer an opportunity for command members to connect with educators and others who work in the STEM field. "My fellow judges and the teachers and organizers also were a pleasure to meet," said Dr. Shykoff.

Through participation in science fairs and other community efforts, NAMRU-Dayton hopes to encourage and inspire the next generation of scientists and engineers to join our mission of military support.

This summer, multiple student interns were accepted to participate in various internship programs with NAMRU-Dayton to gain educational experience and mentorship from expert scientists.

Link to original story: https://www.facebook.com/notes/naval-medical-research-unit-dayton/naval-research-unit-members-participate-in-local-science-fairs/2360552690672407/

STEM groups learn from Navy Scientists at WPAFB

07.12.2019 published, WPAFB Skywrighter

WRIGHT-PATTERSON AFB, OH -- When school is out, Science, Technology, Engineering and Math (STEM) tours are in session at Naval Medical Research - Dayton. This year, the Dayton Regional STEM School and the Department of Defense's STEM awareness and outreach program, STARBASE visited the command to learn about potential careers in STEM fields, their application in the military, and different paths to pursuing military research.

Dayton Regional STEM School kicked off the summer tours by including NAMRU-Dayton as a stop on their slate of 10-day "STEMmersions". These programs allow students to spend an entire school day focused on a single topic, and their NAMRU-Dayton visit focused on "aviation". Over 30 middle school students toured the labs, learning how our host of advanced scientific equipment helps to improve warfighter safety and performance. Students visited our Reduced Oxygen Breathing Device Environment (ROBE), Vision Sciences Laboratory, Visual Vestibular Sphere Device, and the Disorientation Research Device – the Kraken™.

"The STEMmersion programs teaches science and math in ways that we wish we had the time, resources and expertise to do in the regular classroom," said Brittany Shores, a middle school teacher at the Dayton Regional STEM School. "It's experiential, exploratory learning".

Lieutenant Commander Matthew Doubrava, command flight surgeon and Biomedical Sciences Department Head, NAMRU-Dayton said, "It's important to get as much STEM-oriented teaching to young people as often as possible. We need a new generation of 'STEMennils'."

"Youth today are quite familiar with digital interfaces in the form of video games, and social media platforms," said research assistant Grant Roush, who demoed vision technologies for the students. "But when they get to see the realism of training simulators that combine the digital interface with applied technology, it gives them a real world perspective of advanced capabilities rather than just a gaming platform."

DoD STARBASE, a program which serves elementary students historically under-represented in STEM, was the next to visit. The program aims to engage students through the inquiry-based curriculum with its "hands-on, mind-on" experiential activities, and motivate them to explore STEM fields as they continue their education.

NAMRU-Dayton's military and civilian scientists and research personnel demonstrated and explained the importance of laboratory research to finding solutions for warfighter safety. Encouraging students to interact with different technologies and scientists, to offers a more concrete understanding on the use of STEM in different career paths.

Civilian scientist and senior research engineer, Dr. Barbara Shykoff, volunteered to lead the group for the first time and enjoyed sharing her passion for the work performed at NAMRU-Dayton. "It's fun to watch a member of a group of young people let genuine curiosity overcome the need to be silly with friends," said Shykoff.

Though the summer tours have ended, NAMRU-Dayton looks forward to continuing the partnership with the regional STEM exposure programs to promote the exploration of military and applied research opportunities.

Link to original story: http://www.skywrighter.com/

Tri-Service research efforts seek to meet DoD needs

08.14.2019 published, DVIDS

DAYTON, Ohio -- The recent Tri-Service Toxicology Consortium (TSTC) provided another opportunity for civilian and uniformed members of the Air Force, Army and Navy to discuss strategic planning and share updates regarding the state of toxicology research in the Department of Defense (DoD). During the August 6-7 bi-annual meeting, scientists from each branch informed the group of their latest projects, participated in brainstorming sessions, and held discussions on current and future DoD needs. Researchers from Naval Medical Research Unit-Dayton's (NAMRU-Dayton) Environmental Health Research Effects Laboratory (EHEL) attended to network with other service members and present updates on their own research.

"TSTC always offers a wonderful opportunity to connect with colleagues and stay abreast of the latest developments in our field," says Lt. Cmdr. Taj King, biochemist and Inhalation Toxicology Department Head. "It also allows great insights into the collaborative efforts we can pursue."

To give participants an idea of collaboration opportunities, EHEL Director, Dr. Karen Mumy, provided an overview of EHEL capabilities for the group. She also gave a presentation on behalf of EHEL research physiologist, Dr. Joyce Rohan, entitled, "Correlation of electrophysiological parameters with behavioral performance in an animal model using aluminum exposures". The talk gave insight into the work Rohan's team is doing to establish a correlation analysis between electrophysiological recordings and behavioral performance to assess the possibility of memory loss and other cognitive issues potentially faced by military personnel.

Lt. Dan Xu, biochemist and Occupational and Environmental Health Department Head, also represented the command with a brief entitled, "Evaluating whether dermal contact with air pollution can contribute to the development of asthma". The presentation highlighted the work cell biologist, Dr. David Wu, and other researchers are doing to understand the causes of increased respiratory complaints experienced by deployed service members.

"This meeting definitely helps keep the community up-to-date," says Lt. Cmdr. Matt Shipman, Naval Aerospace and Operational Physiologist and Department Head of Technical Research and Support at EHEL. "With the variety of projects we're all working on, it's certainly useful to come together and get the lay of the land".

The next scheduled TSTC meeting is tentatively planned for February 2020, and NAMRU-Dayton hopes to continue to support and contribute to the group's common goal of protecting human health and the environment for the DoD.

Link to original story: https://dvidshub.net/r/m2r8qm

Lab Specs take Flight! Responding to USCG Aviation Needs

08.21.2019 published, DVIDS

DAYTON, Ohio -- The effects of vestibular phenomena on operator health, readiness, and performance are numerous. From traumatic brain injury-related balance dysfunction to motion- sickness to pilot spatial orientation, the relevance of the vestibular system to key operational problems is significant. After several years of re-building under the Naval Medical Research
Unit Dayton at Wright-Patterson Air Force Base, Naval Aerospace Medical Research Laboratory's (NAMRL) vestibular research program is poised to regain its historical position as a world leader.

NAMRL, originally located on Naval Air Station Pensacola, enjoyed a long and distinguished position at the forefront of vestibular research for many years. Such figures as Capt. Ashton Graybiel and Dr. Fred Guedry established the lab as a leader in the field throughout the latter half of the 20th century. However, a substantial loss of scientific staff associated with the lab's 2010 move to WPAFB led to a much reduced vestibular research capability. Now, new facilities and the re-establishment of a core of expert researchers are the catalysts for this resurgence.

Today, the lab features several important research devices at the Dayton facility. The Visual- Vestibular Sphere Device (VVSD) contains a rotating chair surrounded by a rotating enclosed sphere designed for conducting basic research on vestibular and visual interactions. The Vertical Linear Accelerator affords up to 20 feet of vertical motion, while the Neuro-Otologic Test Center provides a precisely programmable rotating chair in a light-tight chamber. Most significantly, the lab received the long-awaited Disorientation Research Device, or the Kraken™ in October 2016. The Kraken™ is a six axis-of-motion research device that will support a range of basic and applied research on vestibular and acceleration effects. Data collection began on the first research project to use the Kraken™, June 2018, as part of a joint effort with NASA Langley Research Center to investigate and mitigate pilot spatial disorientation in commercial aviation.

Even more important than facilities to the resurgence of vestibular research is the re-establishment of a core of expert researchers. A series of motion sickness studies now led by Lt. Cmdr. Matt Doubrava, identified an intranasal formulation of scopolamine as a promising countermeasure. Lt. Adam Biggs, research psychologist, established a new capability studying the effects of virtual reality and augmented reality displays on motion or cyber sickness.

We recently welcomed a world-leading vestibular researcher to our ranks, Dr. Dan Merfeld, formerly of Massachusetts Eye and Ear Institute at Harvard Medical School and jointly recruited by NAMRU- Dayton and The Ohio State University (OSU) now serves as NAMRU-Dayton's senior vestibular scientist through an Intergovernmental Personnel Act appointment from the OSU Department of Otolaryngology at the OSU School of Medicine.

Dr. Merfeld is working alongside our researchers, including Dr. Henry Williams, supervisory research psychologist and Capt. Richard Folga, aerospace physiologist, to develop vestibular models of pilot spatial orientation. Dr. Merfeld is expanding the reach of the lab, helping to recruit several visiting scientists and establish research collaborations with leading vestibular researchers at Massachusetts Institute of Technology, Johns Hopkins University, Brandeis University, and the University of Colorado. Further, Dr. Merfeld is taking on the principal role in a joint initiative NAMRU- Dayton is pursuing with OSU to formally recognize and promote central and southwest Ohio as a national-level center for vestibular research through the capabilities of OSU, NAMRU-Dayton, and other institutions, such as the U.S. Air Force 711th Human Performance Wing at WPAFB.

NAMRU-Dayton and OSU are developing a framework to address clinical issues such as balance dysfunction and dizziness, and operational issues such as motion sickness and pilot spatial disorientation. In support of this initiative NAMRU-Dayton and OSU are organizing a vestibular oriented research conference to be held in Dayton, Ohio, spring 2019.

The Naval Aerospace Medical Research Laboratory is equipped with capabilities in acceleration and sensory science, biomedical, and engineering and technical services, all of which are supported by a unique collection of state-of-the-science research devices. Our unique research portfolio enables researchers to transition validated knowledge and effective technologies to the fleet, mitigating and preventing leading factors associated with aeromedical mishaps.

Link to original story: https://dvidshub.net/r/345r44

NAMRU-Dayton Presents Research Findings at Military Health System Research Symposium

08.29.2019 published, DVIDS

DAYTON, Ohio -- Naval Medical Research Unit Dayton scientists participated in the 2019 Military Health System Research Symposium (MHSRS) in Kissimmee, Florida, August 19-22. More than 30 scientists and science support staff from the command attended the annual meeting.

This year's theme, "Research for Readiness", focused on four primary areas: warfighter medical readiness, expeditionary medicine, warfighter performance, and return to duty. NAMRU-Dayton scientists presented research findings and discussed ongoing and future potential for collaboration with fellow innovators. All of which is in support of the unique medical research needs of our military.

"At MHSRS NAMRU-Dayton science experts connect with other experts to share knowledge and bridge data gaps so that we successfully conduct research for readiness," said Captain Matthew Hebert, commanding officer, NAMRU-Dayton.

NAMRU-Dayton's Environmental Health Effects Laboratory (EHEL) and Naval Aerospace Medical Research Laboratory (NAMRL) scientists presented research geared to uphold a ready force. Topics included exposure effects on performance, laser eye protection, Critical Care Air Transport team coordination, spatial disorientation, and fatigue mitigation.

During the poster sessions our EHEL researchers discussed scientific methods used to identify how the health of our military can be impacted by certain environmental hazards and stressors. Research physiologist, Dr. Joyce Rohan's work is assessing Gulf War chemical exposures effect on neuronal function, behavioral performance and several biochemical parameters using a rodent model. Rohan supports collaborative neuroscience and neuro-toxicology studies.

"I look forward to seeing research topics being done in military health, especially those involving the central nervous system. Also the potential for new collaborations," said Rohan.

Another EHEL initiative lead by Dr. Frank Golich, chemist, shared findings from a rodent model study investigating the effects of a contaminate inhalation believed to impact the central nervous system (CNS) and potentially impair individuals. This work will support standards for safe contaminate exposure levels, particularly for occupations requiring extreme focus and attention.

For Golich, the benefit of attending MHSRS is, "the opportunity to connect with other Military Health System researchers" and "share the results of our common efforts to provide the best solutions that may ultimately lead to an overall improvement in the readiness of the Warfighters."

NAMRL researchers presented on a variety of scientific approaches used to mitigate and prevent leading factors associated with aviation mishaps. Lieutenant Commander Micah Kinney, Naval Aerospace Optometrist, shared his team's research on using human performance metrics to support laser eye protection acquisition decision in response the U.S. Coast Guard needs. Related story here: https://dvidshub.net/r/345r44

Throughout the symposium, our researchers spoke with fellow innovators and shared what motivates them to study the unique medical research needs of our military.

Continue on next page

NAMRU-Dayton Presents Research Findings at Military Health System

(continued from previous page)

“I saw an interesting need with multi-service applications,” said Dr. F. Eric Robinson, research psychologist. Robinson presented a poster on a joint-service initiative assessing the effects of experience on Critical Care Air Transport (CCAT) Team Coordination.

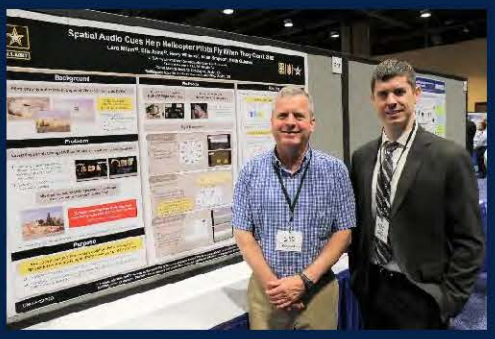
Rounding out NAMRU-Dayton presentations, Dr. Daniel McHail, research psychologist, delivered the results from a larger fatigue mitigation study.

“I was excited to share and discuss our team’s work investigating neural markers of fatigue susceptibility and to learn more about other current efforts in the military health system research community,” said McHail.

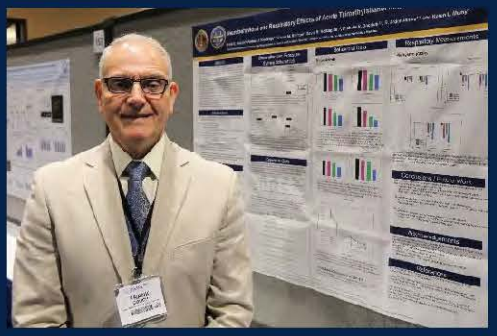
MHSRS is the Department of Defense’s (DoD) premier scientific meeting bringing together scientists, academia, and industry to exchange information on research and health care advancements.

The Naval Medical Research Unit Dayton is a major DoD medical research command and the home of the Naval Aerospace Medical Research Laboratory and the Environmental Health Effects Laboratory. As a subordinate command to Naval Medical Research Center, NAMRU-Dayton conducts aerospace medical and environmental health effects research to enhance warfighter health, safety, performance and readiness. We address identified Fleet needs and results in products and solutions ranging from basic knowledge to fielded technologies.

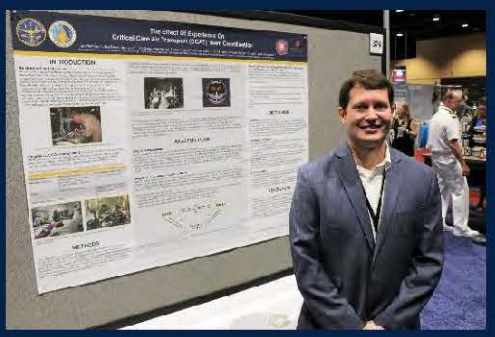
Link to original story: https://dvidshub.net/r/bduwat



NAMRU-Dayton’s Dr. Henry Williams (left) and U.S. Army Aeromedical Research Laboratory’s Heath Jones (right) present a joint service research effort investigating spatial disorientation for helicopter pilot safety.



NAMRU-Dayton's Dr. Frank Golich presents his work at the 2019 Military Health System Research Symposium.



NAMRU-Dayton's Dr. F. Eric Robinson, research psychologist, presents his joint service study looking at the effect of experience on Critical Care Air Transport (CCAT) team coordination at the Military Health System Research Symposium.

Navy Medicine officers participate in the 2019 Military Health System Research Symposium, the DoD's premier scientific meeting. Lt. Dan Xu (center) shared an ongoing Environmental Health Effects Laboratory study for warfighter safety.

NAMRU-Dayton research staff talk with fellow innovators and share what motivates them to study the unique medical research needs of our military during the 2019 Military Health System Research Symposium.

NAMRU-Dayton's Dr. Matthew Funke, Lt. Cmdr. Micah Kinney. Rear Adm. Tim Weber, Commander, Navy Medicine West, and Capt. Matthew Hebert at the 2019 MHSRS. Funke and Kinney presented their research on laser eye protection for military pilots during a poster session.

Command hosted high level visitors in 2019

National Commission on Military Aviation Safety

September 12, 2019. The National Commission on Military Aviation Safety toured Naval Medical Research Unit Dayton's research laboratories and spoke with our investigators on several ongoing research efforts geared toward aviator safety during a visiting to Wright-Patterson AFB.

Dr. Henry Williams, research psychologist, briefs the commission on the high-value research taking place on spatial disorientation mitigation. Here, the commission is in Dr. Williams' Spatial Disorientation Lab in Naval Aerospace Medical Research Laboratory, NAMRU-Dayton

Dr. Peter Le, biomechanical engineer and principal investigator for NAMRU-Dayton's Motion Capture Biodynamics Laboratory housed at Naval Aerospace Medical Research Laboratory. Commissioners included the Honorable Richard Healing (second from the left), Vice Chairman, National Commission on Military Aviation Safety.

Dr. Andrew Keebaugh (right), environmental toxicologist and lead investigator for several research efforts looking to understand the health effects of various environmental exposures briefs the commission in one of the exposure facilities at the Environmental Health Effects Laboratory.

Link to original story: https://dvidshub.net/r/5uzrqu

Physiological Episodes Action Team Lead visits NAMRU-Dayton

On November 4, Rear Admiral Fredrick Luchtman, Physiological Episodes Action Team Lead for the United States Navy visited Naval Medical Research Unit Dayton and experienced the scientific force that is the one-of-a-kind research device, the Kraken. A pilot himself, Rear Adm. Luchtman donned his flight suite and strapped into the capsule with the help of the Kraken crew to partake in a device profile addressing pilot spatial disorientation.

"I really enjoyed my ride in the Kraken," Luchtman said. "The six axes of movement produces a realistic flight experience, providing us the ability to tailor our research objectives to best understand spatial disorientation."

Having an applied research program centered on the Kraken helps investigators work towards solutions to protect and enhance the health, readiness, and performance of aircrew.

Link to original story: https://dvidshub.net/r/cgr9sk

Navy Biochemist Selected for Graduate Level Fellowship

09.25.2018 published

DAYTON, Ohio -- Join us in congratulating Lt. Dan Xu, biochemist at NAMRU-Dayton for her acceptance into the AY20 Full-Time Outservice Graduate Level Certificate in Toxicology, Wright State University Fellowship.

“As a naval officer, I am committed to becoming the finest leader that the Navy has to offer,” said Lt. Xu. “Part of becoming such a leader entails continuing my education in a way that allows me to perform the technical aspects of my duties as well as lead with knowledge and credibility.”

This fellowship is a certificate program and will run one year from the commencement of Duty Under Instruction (DUINS).

“This is quite an accomplishment since she was boarded and selected for this fellowship out of many applicants and there was only one DUINS slot approved for her entire community,” said Capt. Matthew Hebert, Commanding Officer, NAMRU-Dayton.

Following the completion of the program, Lt. Xu is not only looking to apply her experience and skills “to search for solutions to some of the toxicological challenges faced by deployed warfighters,” but also, “to pass on my expertise to the next generation of Navy biochemists and toxicologists.”

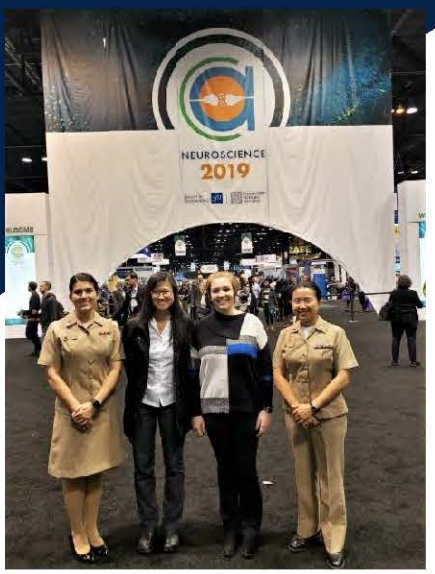
In her current role Lt. Xu is assigned to NAMRU-Dayton’s Environmental Health Effects Laboratory and oversees toxicology research programs that can be applied to minimize operational performance degradation and reduce health risks posed by hazardous materials.

Link to original story: https://www.facebook.com/notes/naval-medical-research-unit-dayton/navy-biochemist-selected-for-graduate-level-fellowship/2538535099540831/

Society for Neuroscience Annual Meeting

10.22.2019 published

NAMRU-Dayton investigators are attending and presenting at the Society for Neuroscience Annual Meeting in Chicago this week! Several of our scientists are experts in the field of neuroscience and related areas such as neuroelectrophysiology, neurobiology, and cognitive neuroscience. With such expertise and exceptional research facilities NAMRU-Dayton is able to support the environmental health effects and aerospace medical research needs of the fleet.



How the Brain Combines and Enhances Sensory Information: Two New Laws

By: Dr. Vince Billock, Senior Research Physiologist, NAMRU-Dayton

09.11.2019 published, DVIDS

Dr. Vince Billock, a senior research physiologist with the Naval Aerospace Medical Research Laboratory at NAMRU-Dayton uses a multi-disciplinary approach to understand how the brain combines sensory information.

DAYTON, Ohio -- Modern multisensory research is about 40 years old. Despite a tremendous research effort, multisensory interactions are not yet properly characterized. This situation contrasts strongly with other sensory phenomena, many of which follow well studied laws and are better understood. Lawful characterization is vital – it guides theory and vets experimentation; it tells you when to be surprised and when to be worried.

For several years I have been studying multisensory enhancement. For example a dim light looks brighter when a sound seems to come from the direction of the light. I've studied two kinds of multisensory enhancements: gated amplification and nonlinear combination. I found that gated amplification follows a power law (Billock & Havig, 2018).

Equation 1 says that to predict, for example, visual amplification by auditory stimulation, all we need to know is the unamplified visual response. The audio signal triggers the visual amplification, but the amplification does not depend on audio strength. This law holds for appearance judgements and it is followed by one type of cortical neurons. For both perception and neural spike rates, the agreement between observed values and Equation 1's predicted values is very high. Similarly, a neural model of this amplification phenomenon, which I developed for rattlesnakes (Billock & Tsou, 2014), has an exponent (0.83) that predicts the most important property of sensory integration – weak signals are amplified more than strong signals.

A different rule governs perceptual sensitivity and bimodal cortical neurons. The law for combining two different sensory channels (A & B) is

$$CombinedResponse = (ChannelAm + ChannelBm)1/m \quad \text{Eq. 2}$$

In unisensory perceptual combinations (like binocular vision which combines the two eyes), the value of m in Equation 2 is usually between 1 and 8. Billock et al. (2019) compared perceptual sensitivity and neural sensitivity for audio-visual combinations using Equation 2. Cat cortical bimodal cells (sensitive to both audio and visual) had a best fitting m value of 1.75. Remarkably, the best fit to comparable perceptual data had a quite similar m of 1.69.

We now know that both perceptual and neural multisensory enhancement follow just two simple laws (Equations 1 & 2). This means that we can now have some confidence in identifying the neural correlates of our perceptual experience. Efforts are underway to extend these results to visual interactions with tactile and vestibular stimuli. Visual-vestibular interactions are of particular importance to understanding spatial disorientations.

References

Billock VA, Kinney M & Meredith MA (2019) To be presented at the Optical Society Fall Vision Meeting.

Billock VA & Havig PR (2018) Scientific Reports, 8, 7645, 1-7.

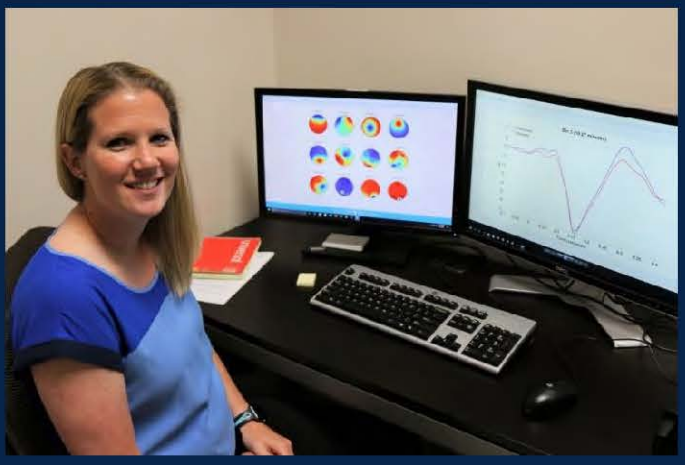
Billock VA & Tsou (2014) Journal of Cognitive Neuroscience 26, 1587-1599

Link to original story: https://dvidshub.net/r/vfvamp

Innovative Research for Aircrew Safety

By: Dr. Kara Blacker, Research Psychologist, NAMRU-Dayton

09.11.19 published, DVIDS



Dr. Kara Blacker, research psychologist in the Naval Aerospace Medical Research Laboratory at Naval Medical Research Unit Dayton (NAMRU-Dayton), uses recent advances in neuroscience to develop new methods for monitoring responses to physiological stress in a simulated operational environment.

DAYTON, Ohio -- The Naval Medical Research Unit Dayton's (NAMRU-Dayton) Naval Aerospace Medical Research Laboratory (NAMRL) continues to respond to the issue of physiological episodes with the goal of developing ways to keep aircrew safe. One line of research in these efforts is using electroencephalography (EEG) as a novel approach to detecting hypoxia, or low-oxygen condition.

Hypoxia is known to adversely affect a range of sensory and cognitive functions, such as reaction time and memory. However, symptoms of hypoxia vary widely among different individuals and some individuals do not experience any identifiable symptoms at all. Therefore, a reliable method for detecting hypoxia and the impending negative effects on cognition is needed.

Dr. Kara Blacker, research psychologist, is testing the utility of EEG to detect hypoxia before symptoms occur. NAMRL's EEG Lab has a 64-channel Brain vision ActiCHamp EEG system that measures the electrical activity from the brain and can be used to assess sensory function. EEG is a non-invasive measure of brain activity that is recorded from electrodes placed on a person's scalp. In an ongoing series of studies, Dr. Blacker has found that an EEG signature, known as an event-related potential (ERP), is sensitive to hypoxia. By comparing the ERP response under normal conditions (i.e., normoxia) and a low-oxygen condition (i.e., hypoxia), the results show that the neural response is reduced under hypoxic conditions. Notably, this difference in the neural response occurred within the same timeframe that the participants began performing worse on a task under hypoxic conditions. These results suggest that EEG may be able to serve as an early detector of hypoxia.

Dr. Blacker and her team are currently working on refining this work to test whether ERPs can also serve to track recovery from a hypoxic exposure, which may inform return to duty practices. They are also developing methods to measure the ERP response faster and with less hardware, to make the process easier to use in an operational environment.

Link to original story: https://dvidshub.net/r/87whvg

Developing Novel Neuronal Models to Advance Neurological Function Research

By: Dr. Andrew Koesters, Neuroscientist, NAMRU-Dayton

09.11.2019 published, DVIDS

Dr. Andrew Koesters, neuroscientist, sits next to a biosafety cabinet to culture neurons in Naval Medical Research Unit Dayton's (NAMRU-Dayton) Environmental Health Effects Laboratory, which is equipped to study a variety of hazardous environmental effects in an effort to develop health protective exposure standards for our military.

DAYTON, Ohio -- Military service members become exposed to a wide variety of hazardous substances that have the potential to produce adverse health effects. Naval Medical Research Unit Dayton's (NAMRU-Dayton) Environmental Health Effects Laboratory (EHEL) is charged with investigating health effects of environmental hazards and stressors to develop health protective exposure standards. Funded by the Navy In-House Laboratory Independent Research Program (ILIR), neuroscientist and principal investigator Dr. Andrew Koesters, is conducting a study to better understand neurological function post exposure.

Previous studies indicate exposure to lead may result in lead poisoning, which is multi-symptomatic in nature and known to be especially lethal to the nervous system. Firing ranges, both civilian and military, have been recognized as sites for possible lead exposure and toxicity, by inhalation of fumes and dust, ingestion via contaminated hands, or through contact with the skin that can have varying effects depending if the exposure is acute or chronic. Acute exposure commonly involves a rapid onset of nausea, headache, and/or cognitive impairment, while chronic, long-term exposure has a higher incidence of neurodegeneration and psychiatric disorders.

The nervous system relies on its ability to respond and adapt to changes in its activity levels, called 'synaptic plasticity'. Effective functioning of this process underlies normal neurological functions such as movement, thinking, learning and memory, and perception, and malfunctioning of this plasticity could trigger a variety of psychiatric, cognitive, and neurological disorders. There are several ways that the brain employs these plasticity mechanisms, which serve different functional purposes. One type of plasticity is thought to be responsible for learning and memory, and it has been established that lead can impair this process resulting in cognitive deficits. More recently, lead has also been linked to another type of plasticity, homeostatic plasticity, in the brain that is believed to stabilize neuronal function. Although it has been known that lead results in nervous system dysfunction and neurological impairments, it is still not known how.

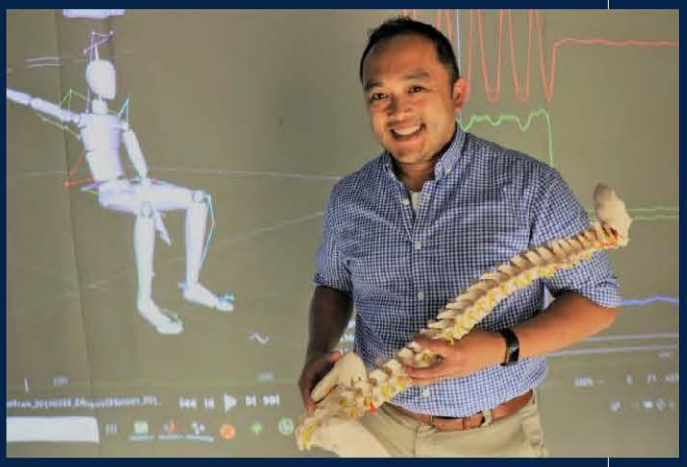
Using these links between lead exposure and altered homeostatic plasticity within the brain, Dr. Koesters hopes this research will eventually result in new preventative or intervention countermeasures to lead poisoning and to develop new models that the military, academia, and industry can use to better investigate neurological function.

Link to original story: https://dvidshub.net/r/sliiwy

Research to Improve Spine Health among Aircrew

By: Dr. Peter Le, Biomechanical Engineer, NAMRU-Dayton

09.11.19 published, DVIDS



Dr. Peter Le, biomechanical engineer, leads research efforts to improve spine health in military aviators as a part of Naval Medical Research Unit Dayton's (NAMRU-Dayton) Spine Health Improvement Program lab (SHIP) housed in the Naval Aerospace Medical Research Laboratory at NAMRU-Dayton. Through basic and applied research targeting the mitigation of low back and neck disorders, research aims to address prevention and rehabilitation through a variety of methods.

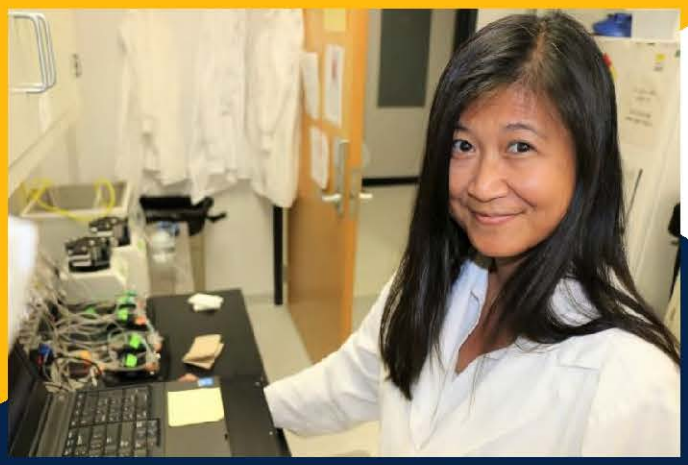
DAYTON, Ohio -- The strenuous occupational demands endured by our military aircrew have resulted in a host of musculoskeletal disorders, with the highest reports related to low back pain (LBP) and neck pain (NP). These reports are associated with high medical costs, inability to fly, as well as reduced productivity and performance, thereby affecting operational readiness and effectiveness. Although a significant amount of research has attempted to reduce the risk of LBP/NP, the problem persists as causal pathways remain unclear. Survey data have provided knowledge on areas of concern (i.e., poor cockpit ergonomics, awkward postures, whole-body vibration, head-supported masses, etc.) and corrective interventions have been deployed as an immediate response, but many have failed because they have not targeted the underlying problem.

The Spine Health Improvement Program (SHIP) has several initiatives to understand and develop strategies to reduce LBP and NP among aircrew. These initiatives target causal mechanisms of injury, employ a 'systems-perspective' philosophy (interaction between physical loads, psychosocial/organizational factors, and individual differences), while developing approaches to streamline measurements in the field and track return-to-duty status. Dr. Peter Le, biomedical engineer and program lead for SHIP, is leading the effort in response to the National Defense Authorization Act (NDAA FY17), Sec. 750, a request to study the health of rotary-wing and tilt-rotor pilots and Joint Concept for Health Services (2015), required capability #5: medical mitigation of the environment. SHIP targets both prevention and return-to-duty, through quantifiable, biomechanical/physiological measures. These include measures of movement, muscle activity, force production, fluctuations in heart rate, and changes in muscle oxygenation, while integrating task performance as a factor to understand the mind-body interaction. These data allow us to explore possible links between biomechanical changes and human performance. While these measures may provide insight between testing conditions, the key lies within the interpretation of the measures to explore the causal pathways of injury.

Current funded efforts target three areas: 1) causal pathways of LBP and NP during prolonged seating (i.e., visual stressors, individual differences/cognitive workload and biomechanical effects), 2) development of analytical methods to quantitatively measure biomechanical functional status in the field, and 3) evaluation/validation of fielded motion tracking analytics systems. In addition to the target areas, the laboratory capabilities are designed with the intent to enhance collaborations and support multiple research groups needing quantitative biomechanics/ ergonomics assessments. These currently include 1) assessments of industrial exoskeletons (USAF 711th HPW) and 2) movement differences from body-mounted sensors and equipment (Gallo and Warner).

Overall, the SHIP lab is developing capabilities to assess causal pathways for LBP/NP, design methods to assess those pathways, and evaluate currently fielded systems/interventions. In essence, the SHIP philosophy to reduce LBP and NP among our aircrew is to be Intervention-Oriented, Mechanism-Driven.

Link to original story: https://dvidshub.net/r/eqhvuy



Dr. Joyce Rohan, research physiologist, is in the Naval Medical Research Unit Dayton's (NAMRU-Dayton) Environmental Health Effects Lab. Here, Rohan creates lab models to accurately reflect the myriad of environmental conditions Service members may experience.

Contribution of Brain Slice Electrophysiology in Neurotoxicity Assessments

By: Dr. Joyce Rohan, Research Physiologist, NAMRU-Dayton

09.11.2019 published, DVIDS

DAYTON, Ohio -- Detecting cognitive deficits in an animal model can be difficult because they communicate differently than humans. Behavioral assays that assess thinking in animals are complicated to perform, often requiring multiple days, making detection of immediate effects challenging. In addition, these cognitive tests typically cannot be performed on the same animals more than once and thus additional sets of animals are needed to evaluate effects at multiple time points after exposures. Electrophysiology offers an alternative approach for detecting cognitive effects by directly measuring the electrical activity of neurons that are essential for cognition.

At the Naval Medical Research Unit Dayton's (NAMRU-Dayton) Environmental Health Effects Laboratory, we have incorporated electrophysiology using brain slice in conjunction with biochemical measurements and behavioral testing for our neurotoxicity studies. We currently have five funded projects in which brain slice electrophysiology plays a prominent role in characterizing exposure effects on the central nervous system. Those projects involve exposures ranging from chemicals routinely used during the Gulf War to extreme temperatures. Most of our brain slice electrophysiology studies focus on the hippocampus, a region of the brain essential for cognitive processes such as learning and memory. The contribution of this electrophysiology is to aid in the detection of subtle changes in neuronal function within the hippocampus that can lead to cognitive impairments. Our microelectrode array system is capable of delivering electrical stimulations and thus can be used to evaluate not only spontaneous neuronal activity but also synaptic transmission (communication among neurons) and synaptic plasticity (the ability of neurons to change strength of their contribution), both of which are absolutely essential for cognitive processes.

Using brain slice electrophysiology, we have found that different chemicals induced distinct changes in neurons within the hippocampus. For example, exposure to chemicals commonly used during the Gulf War induced reduction in the synaptic transmission, an enhancement of paired pulse facilitation which is a measure of short-term synaptic plasticity, and a reduction in spontaneous activity. A separate study showed that exposures to aluminum chloride induced a reduction in long-term potentiation which is a measure of long-term synaptic plasticity, likely indicating an impairment in learning and memory. We are currently addressing the question of which electrophysiological parameters can be correlated with cognitive impairment. In addition, NAMRU-Dayton also has an in vivo electrophysiology system that enables the recording of neuronal activity in a live, freely moving animal so that we can record neuronal activities at multiple time points in the same animal. NAMRU-Dayton also has a patch clamp electrophysiology system that enables the recording of single neurons so that we can gather insight into the pathways that are triggered inside of cells as a result of exposure to chemicals or other stressors.

Together with our existing biochemical and animal behavioral capabilities, the addition of electrophysiology in our neurotoxicity toolbox has equipped us to better understand threats to Service members and therefore protect them against potential neurotoxic hazards.

Link to original story: https://dvidshub.net/r/n6vm8t

Tackling spatial disorientation: A deadly threat to aviation safety

By: Dr. Henry Williams, Senior Research Psychologist, NAMRU-Dayton

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Dr. Henry Williams, senior research psychologist in the Naval Aerospace Medical Research Laboratory at Naval Medical Research Unit Dayton (NAMRU-Dayton), explains the unique capabilities in the spatial disorientation lab. Dr. Williams uses flight simulators to support pilot safety by specifically and systematically comparing how various types of workloads interfere with the maintenance of spatial orientation in simulated flight, potentially causing spatial disorientation.

DAYTON, Ohio -- Spatial disorientation (SD) refers to a pilot's misperception of the attitude, position, or motion of his/her aircraft with respect to the Earth's surface and/or gravitational vertical. The Naval Safety Center has cited SD as the number one contributing aeromedical factor in fatal aviation mishaps. When SD occurs, it typically does so in some form of degraded visual environment where the pilot lacks a clear view of the horizon, such as flight at night, in the clouds, or in blowing snow or sand. These are all conditions in which our military aviation personnel must operate. Without a visible horizon even the normal forces of flight can create powerful illusions that become extremely disorienting. If not recognized and resolved quickly, SD can lead to controlled flight into terrain, midair collision, entry into unusual attitudes, or inappropriate control inputs resulting in aircraft stall, loss of control, and/or structural failure. If SD leads to a mishap, it is usually a fatal mishap.

While several studies have examined the effects of SD on cognition or have linked increased cockpit workload to SD, few specifically and systematically compared how various types of workload interfere with maintenance of spatial orientation. Along with our Air Force and Army colleagues, Naval Medical Research Unit Dayton's (NAMRU-Dayton) SD Lab is looking into this issue with support from the Defense Health Agency Research and Development Directorate and the JPC-5 Aviation Mishap Prevention Working Group.

In a recent study in our lab, 24 pilots flew simulated flights where they followed a lead aircraft first above, then into dense clouds. The lead aircraft then disappeared while in a turn, whereupon the subject was to recover to straight and level flight. Four different workload conditions were presented. The baseline condition included no additional workload, while the other conditions added either a verbal working memory task, a spatial mental rotation task, or a spatial variable-following-distance task. Measures of flight performance included the number of control reversal errors (CRE's), where the subject banked the aircraft in the wrong direction during recovery, and instances of unusual attitudes in the clouds. The results showed that the verbal working memory task condition led to a statistically significant threefold increase in the number of control reversal errors, while the mental rotation and variable-following-distance task conditions yielded significant increases in unusual attitudes.

This type of research helps scientists better understand SD because it shows that cockpit workload need not be spatial in nature in order to increase SD incidence, since it was the verbal task that led to the most CREs. This work also demonstrates the importance of using various measures of SD; the two spatial workload tasks would have appeared to have had no effect on pilot performance were it not for the unusual attitudes metric.

Decreasing the occurrence of SD is an ongoing challenge. Through research like this we can increase our knowledge about SD and the conditions that can cause it, and in turn better educate our aircrew on how to avoid and recover from this deadly threat.

Reference:
Williams, H.P., Horning, D.S., Lawson, B.D., Powell, C.R., & Patterson, F.R. (November 2018). Effects of various types of cockpit workload on incidence of spatial disorientation in simulated flight. (Report No. NAMRU-D 19-06). Dayton, OH: NAMRU-D.

Link to original story: https://dvidshub.net/r/cgggt6

Naval Research Internships Inspire Future Careers

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DAYTON, Ohio -- This summer, Naval Medical Research Unit Dayton (NAMRU-Dayton) welcomed a cohort of 13 students with science, technology, engineering, and math (STEM) backgrounds to intern at the command for a few weeks of scientific learning and exploration. The range of internship opportunities allowed students to shadow our staff in conventional scientific research fields as well as other STEM areas, including fabrication and engineering.

“The most surprising thing about NAMRU-Dayton was the amount of projects going on at once,” said Natalie Gut, an intern at the Environmental Health Effects Research Laboratory (EHEL). “Everyone seems to have a hand in multiple projects. Every day is different for me.”

Kasey Bernt, an intern for NAMRU-Dayton’s Naval Aerospace Medical Research Laboratory (NAMRL) agreed, stating, “With all of the projects going on, the research and learning environment here has been full of opportunity.”

Not only do these internships provide opportunities for students, but they also help our command continue to grow and innovate.

“These internships give NAMRU-Dayton access to young minds and current thinking which offers us a different perspective,” said Dr. Lynn Caldwell, senior research psychologist at NAMRL. “It gives young students the opportunity to see how research is conducted in a real lab setting, equipping them with valuable skills to prepare them for professional challenges.”

Along the way, each student had the guidance and support of a mentor invested in their personal and professional growth to face the challenges they experienced.

“Feeling like I can go to people and gain knowledge that I need not only for this job, but for furthering my own goals, has been a wonderful part of my time here,” said Megan Boltz, an intern for fatigue studies at NAMRL. “It’s great being part of a team.”

Indeed, NAMRU-Dayton offered interns the ability to make meaningful contributions to our science and make their mark as valuable team members.

“Our interns have been extremely helpful in getting our projects finished,” said Dr. F. Eric Robinson, research psychologist and mentor to two interns. ”They help us prepare for projects, collect and organize data, and help with purchasing and setting up equipment. We couldn’t have done the work we did this summer without their support.”

Often, the ability to make a difference is often what keeps our interns coming back to the command, as in the case of returning research intern, Ashton Hughes.

“I chose to come back to NAMRU-Dayton because of the mission,” says Hughes. ” For example, right now, I’m working on a project focused on warfighter safety during critical care air transport. I feel great knowing that what I do will help someone.”

Tyler LaBance, a fabrication intern who also returned for a second summer with the command, shares the similar sentiments.

“I enjoy feeling good about my work, and I was definitely excited to come back,” said LaBance. “Where else can you work on something as unique as the Disorientation Research Device? Not only do we get to interface with interesting equipment, but we contribute to projects that help save lives.”

Though the internships last just a few weeks, the experiences they offer can provide the basis for an entire career.

“This internship was an amazing way to gain more insight into the scientific world,” said psychology intern, Marissa Tharp. “I feel more confident about pinpointing my research interest for when I pursue my masters degree.”

As the interns move on to pursue their educational goals, NAMRU-Dayton hopes to continue its commitment to fostering an environment which encourages the professional development of STEM students. The command looks forward to welcoming new cohorts in the years to come.

Link to original story: https://dvidshub.net/r/bno5l3

Scientists Study Inhalation Toxicology for Service Personnel Safety

By: Dr. Brian Wong, Senior Inhalation Toxicologist, NAMRU-Dayton

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Dr. Brian Wong prepares for a laboratory study at Naval Medical Research Unit Dayton's (NAMRU-Dayton) Environmental Health Effects Laboratory. Dr. Wong designs studies to determine potential health effects associated with exposure to environmental stressors to address the Unites States Navy and the Department of Defense needs.

DAYTON, Ohio -- Since 2010 my mission has been to work with scientific experts and their research teams at the Naval Medical Research Unit Dayton's (NAMRU-Dayton) Environmental Health Effects Laboratory (EHEL) to design studies to determine potential health effects associated with exposure to environmental stressors, whether in the sea, on land, or in the air. Addressing the United States Navy and the Department of Defense needs, EHEL's goal is to enhance warfighter health, safety, performance and readiness through research.

The field of inhalation toxicology is the science of the biological effects of materials that can be inhaled by people. This field is truly multidisciplinary because it requires contributions from several areas of expertise. These areas can include chemistry, to understand the properties of the test material; engineering of all kinds, to put together systems to produce a test atmosphere under well-controlled conditions; whole animal biology and biochemistry, to evaluate the effects on the research subjects; the exposure effects on behavior, coordination, memory, or decision-making abilities; and finally translational expertise to be able to relate results to people.

EHEL research supports the Navy in addressing issues relevant to submariner health, specifically the potential risk to women in the non-ambient submarine atmosphere because components of the atmosphere had never been tested in the context of reproductive and developmental considerations. NAMRU-Dayton engineers and technicians built state-of-the-science systems to simulate the oxygen and carbon dioxide found aboard Navy submarines and collaborated with toxicologists and reproductive specialists to determine if there was a potential risk to females. The Navy uses these studies to set safe exposure limits of carbon dioxide in the confines of a submarine. Currently, emissions from 3D printing technology are being assessed for potential inhalation toxicity.

On land, jet airplane fuelers and servicers might be exposed to jet fuel mists as planes are refueled. The military is testing eco-friendly jet fuels and alternative methods to limit dependence on crude oil. To understand how these fuels compare in toxicity, EHEL collaborated with the United States Air Force Alternative Fuels Certification Office (AFCO; AFMC ASC/WNN), WPAFB OH to study if safe exposure limits need to be readjusted. In response to service personnel returning from Southwest Asia experiencing respiratory issues, EHEL simulated dust storms and waste disposal burn pits to determine if the exposure to dusty conditions, while in the vicinity of a solid waste open air burn pit, could explain these respiratory problems.

In the air, as an airplane climbs, air pressure decreases, as does the amount of oxygen available to a pilot. Planes are equipped with a system to increase the oxygen in the pilot's breathing air to ensure an adequate oxygen supply. However, measurements taken in the breathing air have detected some contaminants. The Navy and Air Force are intensely interested in ensuring these contaminants do not exceed a safe level for the pilot, and that the contaminants are not having an indirect side effect on pilot performance. The NAMRU-Dayton EHEL engineering group adapted some of our inhalation exposure systems to handle reduced pressure so we can take research subjects to a simulated altitude, expose them to test contaminants, and then be evaluated by EHEL behavioral scientists.

I am adapting my experience with inhalation studies with the expertise of EHEL researchers to look at effects on physiology and behavior to further ensure the safety and operational capabilities of our service personnel.

Link to original story: https://dvidshub.net/r/lysaso

Intergovernmental Personnel Act participants support Navy research unit

04.23.2019 published, DVIDS

DAYTON, Ohio – Naval Medical Research Unit Dayton (NAMRU-Dayton) research is executed by highly qualified individuals with unique capabilities and professional backgrounds, including Intergovernmental Personnel Act (IPA) participants supporting the command.

IPA participants occupy a unique space at NAMRU-Dayton, merging the resources, expertise, and experience of outside academic partners and collaborators with those of the Department of Defense (DoD). A unique aspect of IPAs is that they are permitted to serve as principal investigators (PIs) on scientific studies conducted at the command. Their roles allow them to manage projects as well as money, giving them a degree of autonomy that fosters a more seamless partnership between NAMRU-Dayton and our collaborators. Four of our researchers have IPA status and each have their own perspective on the value of the program.

Drs. Valarie Schroeder and Jeffrey Phillips were previously employed as government civilians at NAMRU-Dayton before accepting other positions. At present, both work with the command remotely, representing NAMRU-Dayton in their current workplaces and communities, while collaborating on projects that fall under the umbrella of our research mission.

At the Florida Institute for Human and Machine Cognition (IHMC), Dr. Phillips, a research psychologist, and NAMRU-Dayton plank owner, one of the original scientists who established the Naval Aerospace Medical Research Laboratory (NAMRL), sees tremendous value in his role as an IPA.

“Naval Air Station Pensacola is home to many of NAMRU-Dayton’s customers and stakeholders. NAMRU-Dayton’s location in Dayton, Ohio has established a productive link with the Air Force, but it has limited our interaction with these customers in Pensacola,” said Dr. Phillips. “The IPA allows me to represent NAMRU-Dayton to these customers. From this location, I get access and insight from operators, flight surgeons, operational physiologists, and other Navy personnel who serve Navy personnel.”

For Dr. Schroeder, who transitioned from government civilian to contractor with the Henry M. Jackson Foundation for the Advancement of Military Medicine to her current role as an IPA, the program and her time at NAMRU-Dayton are interconnected.

“The main opportunity offered to me as an IPA is the ability to be a principal investigator on a project. In our career, this is a great opportunity,” said Dr. Schroeder.

“I have had the wonderful opportunity to be mentored by two of NAMRU-Dayton's senior research psychologists, Drs. Lynn Caldwell and Michael Reddix. Dr. Caldwell and Dr. Reddix have guided me in research design and execution as a junior psychologist. They have mentored me in all steps of the research process, from writing white papers and proposals, to protocol writing, financial management, and project execution and management,” said Dr. Schroeder.

The command’s additional IPAs, Drs. Daniel Merfeld, Elizabeth Damato and Michael Decker, join us from academic institutions.

Dr. Merfeld is a professor at The Ohio State University College of Medicine (OSU) in the department of Otolaryngology – Head and Neck Surgery and serves as the senior vestibular scientist at NAMRU-Dayton. The partnership between OSU and the command provides him access not only to world-class research facilities including the Disorientation Research Device (DRD), also known as the Kraken and the Visual Vestibular Spherical Device (VVSD), but to a different group of people as well.

“From strictly a utilitarian perspective, being an IPA participant opens funding opportunities that allow me to contribute my basic science skills and expertise to military problems,” said Dr. Merfeld. “I consider it an honor…to help the military save pilots’ lives by working to improve our understanding of spatial disorientation and its impact on aircraft accidents.”

Speaking on the opportunities the program provides, Dr. Merfeld remarks,“ [Through the IPA program] I have had the unique opportunity to collaborate with outstanding NAMRU-Dayton scientists with broadly varying interests ranging from spatial disorientation to human performance.”

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For other IPAs, the program provides not only reciprocal access to different facilities and devices, but also the ability to share information with interested parties and compare and contrast different processes.

"My eyes were opened to a field of new opportunities," said Dr. Damato, an associate professor at Case Western Reserve University School of Medicine and senior research physiologist at NAMRU-Dayton. "Although I was aware that the DoD funded external investigators, I was not aware of the fleet of scientists that were directly employed by the military as civilian scientists."

She has leveraged her role as an IPA to pass along information to her students to help increase awareness of scientific opportunities at NAMRU-Dayton and propel the pipeline for qualified researchers to embark upon a career in military research.

"Our research also provides the vehicle to engage other university faculty members who are hoping to also support NAMRU-Dayton's mission," said Dr. Damato.

Dr. Decker, associate professor and colleague of Dr. Damato at Case Western Reserve University and neuroscientist supporting NAMRU-Dayton, also values the unique opportunities the IPA program provides.

"Our collaborations with aviators and personnel who work in extreme high altitude environments and visit our lab to participate in studies, provide unique insights into physiologic challenges imposed by austere environments," said Dr. Decker. "Until joining NAMRU-Dayton, those collaborations did not exist."

Whether they come from an academic or commercial background, the IPAs infuse new ideas and experiences into the military milieu while enjoying the opportunities that NAMRU-Dayton offers to implement those ideas within environments not typically accessible to non-DoD scientists. Though they make up a small percentage of the command, the IPA participants provide significant value to both NAMRU-Dayton and their home institutions, and each play a vital role in moving the command's research mission forward.

Link to original story: https://dvidshub.net/r/qvwwab

Dr. Michael Decker is an associate professor at Case Western Reserve University School of Medicine and is a neuroscientist at NAMRU-Dayton in the neuroimaging lab.

Dr. Elizabeth Damato is an associate professor at Case Western Reserve University School of Medicine and a senior research physiologist at NAMRU-Dayton.

Dr. Valarie Schroeder is a cognitive psychologist with the Henry M. Jackson Foundation for the Advancement of Military Medicine and NAMRU-Dayton.

Dr. Jeffrey Phillips is a research psychologist with dual roles at Florida Institute for Human and Machine Cognition and NAMRU-Dayton.

Dr. Daniel Merfeld is a professor at The Ohio State University College of Medicine (OSU) in the department of Otolaryngology – Head and Neck Surgery and serves as the senior vestibular scientist at NAMRU-Dayton.

New officer assumes command following ceremony

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U.S Air Force photo by R.J. Oriez

U.S Air Force photo by R.J. Oriez

DAYTON, Ohio -- Naval Medical Research Unit Dayton (NAMRU-Dayton) held a change of command ceremony at Wright-Patterson Air Force Base, November 5. Echoing the rich heritage of naval traditions, Captain Matthew W. Hebert turned command over to Captain Nimfa Teneza-Mora.

“I’m truly honored to be here as we gather not only to mark the complete transfer of authority, responsibility, and accountability from one accomplished naval officer to another as Captain Hebert turns over the helm to Captain Teneza-Mora, but also to recognize the military and civilian sailors of this command for their commitment to mission, commitment to those they are honored to serve, and their commitment to each other,” said Rear Admiral Tim Weber, Commander, Navy Medicine West and Director, Medical Service Corps. Rear Adm. Weber addressed ceremony attendees and members of the official party as the guest speaker.

As NAMRU-Dayton commanding officer, Hebert supported the success of the two science directorates, the Naval Aerospace Medical Research Laboratory and the Environmental Health Effects Laboratory in addition to the support staff.

“NAMRU-Dayton, is only a command of 150 persons but we possess all the strength, firepower and reputation of a much, much larger command,” said Hebert.

During his tenure, Hebert had direct oversight of the Navy’s largest medical research and development (R&D) Environmental Health and Aerospace research laboratory. As a reimbursable lab NAMRU-Dayton competes for research dollars and increased their research budget almost 65% and nearly doubled the research science and support staff elements from the previous two years.

Captain Adam Armstrong, Commander, Naval Medical Research Center recognized Hebert for his leadership and said, “throughout it all, you and your Command remained on mission, providing knowledge, advice, and products that directly benefit the warfighter and keeps them on point.”

According to Hebert, the success of NAMRU-Dayton is because, “we are in tune with our fleet customers and priorities. They in turn, trust in your work and lean heavily on what you discover and the conclusions you draw.”

Hebert’s next assignment is Commanding Officer at the Navy Medicine Operational Training Center in Pensacola, Florida.

NAMRU-Dayton’s new commanding officer, Capt. Teneza-Mora, is an Infectious Disease physician from Naval Medical Research Unit No. 6 in Lima, Peru where she was the Executive Officer. She is a seasoned Navy Medicine R&D professional.

“It is a tremendous honor and privilege to be granted the opportunity to lead NAMRU-Dayton and to serve as your Commanding Officer,” said Teneza-Mora, “I am grateful to Rear Admiral Weber, CAPT Armstrong, and Navy Medicine leadership for your trust and confidence in me, and for this extraordinary opportunity to be at the helm of an exceptional research command, that is contributing every day to enhance the health, safety and performance of our Sailors and Marines.”

NAMRU-Dayton is a distinguished laboratory in the Department of Defense with an operational medical research mission and home of the Naval Aerospace Medical Research Laboratory and the Environmental Health Effects Laboratory.

Link to original story:
https://www.daytondailynews.com/news/local/new-officer-assumes-namru-command-following-ceremony/3sklWIFdRb04D5lNu7Q3SP/